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WORK ON THE THEORY OF PROBABILITIES REVIEWED

Several workers in the field of the theory of probabilities and its applications came to Moscow from Leningrad and L'vov in late January 1949 to attend a scientific session held by the Department of the Theory of Probabilities, Mathematics, Institute, Academy of Sciences USSR, and the Chair of the Theory of Probabilities, Moscow State University.

Although these meetings were not of an organized national nature, the reports submitted at them may give some indication of the direction of work and the status of scientific personnel in the theory of probabilities in three of the four Soviet scientific centers which are predominantly preoccupied with this field. Representatives from Tashkent were not present.

A considerable fraction of the reports was devoted to basic classical problems in the theory of probabilities. Ya. L. Rvachyova's* report included the final form of a local boundary theory for equally spaced, integral, independent, random vectors. This result is very general and, while it is very simple in formulation, it will obviously be used frequently. It has been utilized, in particular, in the work on boundary theorems for Markov chains submitted by A. N. Kolmogorov. In this work, an exhaustive study of all degenerate cases was given for the classical case of a finite number of states and constant probabilities of transition. A less rigorous study of the considerably more difficult case of variable probabilities was given in reports by N. A. Sapogov and Yu. V. Linnik. Special mention should be made of the fact that, in his report, Yu. V. Linnik set forth the first quite general results in the direction of local boundary theorems for the case of variable transition probabilities. Essentially new methods were used in this work. R. I. Karpelevich, second-course student at Moscow State University, submitted a complete solution, linked with the theory of Markov chains, of Frobenius' problem concerning the field of possible values of the roots of matrices with nonnegative coefficients.

Yu. V. Prokhorov's results are an important step in the direction of finding the solution of one of the most difficult problems in the theory of probabilities, i.e., finding the necessary and sufficient conditions

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in order that the strengthened law of large numbers may be applied to a sequence of independent values. A large new circle of researches, connected with many practical problems, was initiated by N. V. Smirnov under the title of the theory of "cycling systems." New results in other fields, which have already become traditional at Moscow Sate University, were contained in other reports, i.e., distribution of a maximun of independent values, interpolation of stationary sequences, strengthened law of large numbers, law of the repeating logarithm, etc.

The last session was devoted especially to problems of mathematical statistics. In addition to the survey report submitted by A. N. Kolmogorov, N. V. Smirnov submitted very elegant results on the law of the distribution of the criterion omega-squared. A. A. Lyapunov gave a conclusive solution of the problem concerning the choice between a finite number of hypotheses, which has been treated by many foreign authors under completely artificial and superflucus limitations

Four reports dealt with very special problems from the theoretical standpoint. These problems, however, have practical importance in crystallography, geology, and other fields.

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